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November 3, 2020

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street, N.E.
Washington, D.C. 20554

Re: Notice of *Ex Parte* Presentation, IB Docket Nos. 11-109, 12-340; IBFS File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20151231-00091, SAT-AMD-20180531-00045, SAT-AMD-20180531-00044, SES-AMD-20180531-00856

Dear Ms. Dortch:

On November 2, 2020, Valerie Green, Chief Legal Officer of Ligado Networks LLC (“Ligado”) and the undersigned met with Ron Repasi, Paul Murray, and Bob Pavlak with the Office of Engineering and Technology, and Charles Mathias, Deputy Chief, and Wesley Platt with the Wireless Bureau. During the meeting, we discussed the attached presentation. In addition to the points raised during our meeting with the staff, we take this opportunity to make sure the record is clear that the repetitive, meritless claims from Iridium and certain aviation groups have been thoroughly reviewed and rejected by the Commission.

We begin by addressing Iridium. *First*, in its recent *ex parte* filings,¹ Iridium repeats again its argument from months ago that the FCC’s April 2020 Order (“Order”)² approving Ligado’s license modification applications does not sufficiently address Iridium’s technical analysis. We have previously explained how the Commission’s Order in fact addresses Iridium’s

¹ See, e.g., Letter from Bryan N. Tramont, Counsel to Iridium Communications Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket Nos. 11-109, 12-340, at Attachment (filed Sept. 28, 2020) (“Iridium September Presentation”). Iridium attached materially similar presentations to its *ex parte* letters of July and August 2020, reflecting meetings with Commissioners’ offices; we reference the later-filed one here.

² *Ligado Amendment to License Modification Applications IBFS File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20151231-00091*, Order and Authorization, 35 FCC Rcd 3772 (2020) (“Order”).

arguments in detail,³ and below we again show how the Order provides clear reasons for the FCC's rejection of Iridium's technical analysis.

Second, Iridium continues to claim that the FCC did not adequately address interference to Iridium's aviation communication services. To the contrary, the Order did take on that issue by specifically encouraging Iridium and Ligado to engage in further discussions to address specific use cases, such as around airport facilities.⁴ Ligado remains ready and willing to engage with Iridium regarding their particular concerns—as we have been for the last four years. Ligado recently has reiterated to Iridium its openness to discuss how the companies can cooperate to address any legitimate issues in a reasonable manner.

Finally, Iridium seeks to introduce new points of comparison in an effort to show that the OOB limits adopted in the Order are less protective of Iridium than those extended to other services.⁵ This is a swing and a miss. A closer look at the examples Iridium introduces shows that these OOB limits apply a greater distance away from the relevant bands than the Order's limits apply to Ligado. As we describe further below, when these are compared apples to apples, the OOB limits the FCC has imposed on Ligado are significantly stricter than it has imposed on the other services Iridium references.

With respect to the aviation groups, they also re-tread old ground, restating arguments that the Order thoroughly considered and dismissed. They mischaracterize the FAA and FCC's diligence process in considering the interaction between Ligado's terrestrial network and aviation devices, including helicopters and drones. We correct these matters below.

I. The Order Analyzed and Addressed Iridium's Claims.

Iridium continues to argue that the Order did not sufficiently consider its technical analysis setting forth its concerns regarding harmful interference to Iridium from Ligado's terrestrial operations. That claim ignores the plain text in the decision. The Order provides three clear reasons why the Commission was not swayed by the technical analysis that Iridium submitted. Iridium's disagreement with the Commission's positions does not demonstrate that the Order did not sufficiently explain and justify each of those positions.

³ See Letter from Gerard J. Waldron, Counsel to Ligado Networks LLC to Marlene H. Dortch, Secretary, FCC, IB Docket Nos. 11-109, 12-340 at 6-10 (filed Aug. 19, 2020). Ligado's Aug. 19, 2020 filing—and, in fact, Ligado's Opposition to Petitions for Reconsideration—also responds to the other items raised again in the Iridium September Presentation, including Iridium's claims that the FCC's 2005 OOB limits will not protect Iridium, and that the Order did not properly apply FCC rules and waiver criteria. These claims lacked merit when they were first raised, and time has not cured their defects. We do not reiterate our response to these claims here.

⁴ Order at ¶ 118.

⁵ Iridium September Presentation, Attachment at 7.

First, the Order states that “[t]he interference analysis conducted by Iridium is based on an out-of-channel emissions level that is 9 dB higher than the limit being imposed here.”⁶ In its petition for reconsideration, Iridium argued that it did not have an opportunity to comment on the power levels that the Commission adopted. This claim is absurd given that (i) Ligado told Iridium in person some forty-two months earlier that it had proposed to the staff a 9 dB reduction, (ii) Ligado filed with the Commission a 9 dB OOB reduction to benefit Iridium in November 2016, and (iii) Ligado repeated this offer multiple times, including in public filings.⁷ In fact, Iridium submitted a revised technical analysis on May 22, 2020, after the FCC issued the Order, reflecting that 9 dB OOB reduction. At some point, this assertion becomes willful blindness to—or misrepresentation of—the record, and Iridium cannot be heard to complain that it lacked opportunity to comment on what was patent in the record for years. Thus, the Commission should not consider this revised analysis, since Iridium had no reason other than tactical gamesmanship to not submit it during the pendency of the proceeding.

Second, the Order states that “Iridium uses conservative assumptions with respect to the number of simultaneous interfering signals (assumed to be 18) and path loss for these signals.”⁸ In its recent *ex parte* filings, Iridium claims that its assumptions were based on Ligado’s proposal, the FCC rules, and the CSMAC report.⁹ But the fact that Iridium’s assumptions were based on potentially relevant materials does not mean that they were not conservative. Iridium also cannot pick and choose those assumptions that suit its case.

Third, the Order points out an obvious fact that *Iridium has been on notice for fifteen years* that it would need to co-exist with out-of-channel emissions at levels *much higher* than the levels adopted by the FCC. The Order thus rightly concludes: “Iridium would be expected to be able to co-exist with interference from out-of-channel emissions at a level that has been permitted in the rules since 2005.”¹⁰ The Iridium September Presentation does not rebut this, and in fact Iridium has never had a response to this compelling point — it simply ignores this rather unhelpful fact.

II. Ligado Is Eager to Engage with Iridium on Interaction Between Ligado and Iridium Devices on Aircraft at the Gate.

Iridium also repeats its claim that the Order does not adequately address harmful interference to Iridium’s aviation services specifically. This is simply another means of Iridium contesting the FCC’s view of Iridium’s technical analysis, which addressed all of Iridium’s services. But we want to point out that, at a September 2020 industry session in which Ligado

⁶ Order at ¶ 117.

⁷ Opposition to Petitions for Reconsideration or Clarification, Ligado Networks LLC, IB Docket Nos. 11-109, 12-340, at 21–22 (filed June 1, 2020) (“Ligado Opposition”).

⁸ Order at ¶ 117.

⁹ Iridium September Presentation, Attachment at 5.

¹⁰ Order at ¶ 117.

and various stakeholders participated, Iridium's engineering team stated that: (1) the aggregate interference due to intentional (*i.e.*, overload) and unintentional (*i.e.*, OOB) emissions from Ligado's operations was unlikely to create harmful interference to Iridium's devices in airspace above 300 m; (2) interference due to unintentional emissions from Ligado's operations would not create harmful interference to Iridium's devices during taxi, takeoff, and/or landing;¹¹ and (3) while harmful interference is possible at the gate, this does not pose a safety issue, but rather an operational communications issue.

With regard to the interaction between Iridium and Ligado devices while an aircraft is at the gate, this is precisely the coordination and problem-solving issue that the Commission had in mind when the Order states that Ligado and Iridium should engage in the kind of coordination discussions that routinely take place between spectrum neighbors acting in good faith. Indeed, with regard to Iridium's claims of interference around airport facilities, the Order specifically "encourag[ed] Iridium and Ligado . . . to engage in further discussions to address any use cases that may present unique interference concerns due to deployment patterns or operational considerations, with the aim of concluding arrangements that may be satisfactory to both parties."¹² Ligado is eager to engage on these issues, and there was a sense at the September meeting referenced above that those discussions would be worthwhile to begin at once and would benefit Iridium's customers and the industry in general. We look forward to good faith discussions with Iridium to resolve any harmful interference issues and to put this spectrum to work to advance 5G.

III. Iridium's New Claim That the OOB Limits in the Order Are "Inconsistent With Precedent" Is Badly Informed and Demonstrably Wrong.

Iridium seeks to introduce several new comparison points in an attempt to argue that the OOB limits imposed on Ligado by the Order are "inconsistent with precedent." But a closer look at these examples actually proves the opposite. Iridium is correct when it states that the FCC rules protect the Satellite Digital Audio Radio Services ("SDARS") by "requiring attenuation of OOB by at least $67 + 10 \log (P)$."¹³ But it is incorrect when it states that "this requires emissions to be 20.75 dB lower than the emissions permitted for Ligado OOB at the

¹¹ For clarity, Iridium's engineers did assert that its devices would experience harmful interference due to *intentional* emissions during taxi, takeoff, and/or landing. However, the issue of interference due to overload is not one that Iridium has previously focused on in this docket. This is for good reason—while issues of interference due to OOB are correctly addressed between Iridium and Ligado, Iridium bears responsibility for its services' management of overload. See *Basic Principles for Assessing Compatibility of New Spectrum Allocations*, FCC Technical Advisory Council, Spectrum and Receiver Performance Working Group, at 14 (Dec. 11, 2015) ("Receivers are responsible for mitigating interference outside their assigned channels.").

¹² Order at ¶ 118.

¹³ Iridium September Presentation, Attachment at 8.

upper edge of the Iridium band.”¹⁴ Iridium’s error is pretty basic in that it compares apples and oranges. The OOB limit protecting SDARS applies 13 megahertz away from the higher band edge of SDARS’ left-hand neighbor (WCS Block B), well into the SDARS band itself.¹⁵ By contrast, the OOB limit imposed by the Order to protect Iridium applies one megahertz away from Ligado’s band edge. To translate this to Ligado and Iridium, Ligado’s OOB limit 13 megahertz away from the edge of its band at 1627.5 MHz is -85 dBW/MHz (equivalent to attenuation of OOB by $85 + 10 \log (P)$), which is 18 dB *lower* than the limit the FCC rules impose to protect SDARS.

Iridium makes the same mistake in the next example that it introduces. Yes, the FCC rules “protect Aeronautical Mobile Telemetry by requiring attenuation of OOB by at least $70 + 10 \log (P)$.”¹⁶ But this does not “require[] emissions to be 23.75 dB lower than the emissions permitted for Ligado OOB at the upper edge of the Iridium band.”¹⁷ The OOB limit protecting Aeronautical Mobile Telemetry applies 17 megahertz away from the lower band edge of its right-hand neighbor (WCS Block A).¹⁸ Ligado’s OOB limit 17 megahertz away from the edge of its band at 1627.5 MHz is -98 dBW/MHz (equivalent to attenuation of OOB by $98 + 10 \log (P)$), or 28 dB *lower* than the limit the FCC rules impose to protect Aeronautical Mobile Telemetry.

Iridium’s third and final example is also flawed. It cites the rules that protect EBS/BRS, but fails to mention that these rules only apply to base stations, making them an incorrect comparison for Ligado’s handsets. These rules also apply three megahertz away from the band edge, and only kick in if there is actual documented harmful interference at 1.5 km or more distance.¹⁹ Iridium’s attempt to distort the facts does not withstand minimal scrutiny, and in fact shows that Ligado has to meet stricter OOB requirements to protect Iridium than other services have to protect their neighbors.

¹⁴ *Id.*

¹⁵ 47 C.F.R. § 27.53(a)(4)(i) (requiring all “mobile and portable stations operating in the 2305-2315 MHz . . . band[]” to meet the OOB limit discussed above “on all frequencies between 2328 and 2337 MHz.”) 2328 MHz is 13 megahertz away from upper band edge of 2315 MHz.

¹⁶ Iridium September Presentation at 8.

¹⁷ *Id.*

¹⁸ 47 C.F.R. § 27.53(a)(4)(ii) (requiring all “mobile and portable stations operating in the 2305-2315 MHz . . . band[]” to meet the OOB limit discussed above “below 2288 MHz.”) 2288 MHz is 17 megahertz away from the lower band edge of 2305 MHz.

¹⁹ 47 C.F.R. § 27.53(m)(2)(i) (“If a pre-existing base station suffers harmful interference from emissions caused by a new or modified base station located 1.5 km or more away . . . the licensee of the new or modified base station must attenuate its emissions by at least $67 + 10 \log (P)$ dB measured at 3 megahertz, above or below, from the channel edge of its frequency block”).

IV. The Aviation Parties' Arguments Regarding the 250-Foot "Assessment Zone," Helicopters, and Drones Mischaracterize the FAA and FCC Process.

Finally, we write to correct the record in response to recent filings by ASRI and the "Aviation Representatives."²⁰ These filings yet again recycle years-old claims that the Order comprehensively addressed and rejected.

The Aviation Representatives continue to argue that the Order's adoption of the FAA-recommended 250-foot "assessment zone" did not adequately account for all operational scenarios. As Ligado has repeatedly pointed out,²¹ the Aviation Representatives seek to relitigate issues that were raised with the FAA and now want the FCC to reach a conclusion different from their primary regulator. This claim simply ignores that the Order relied upon FAA conclusions based on the most-restrictive aviation scenarios, including the Helicopter Terrain Awareness and Warning Systems ("HTAWS") scenarios that the Aviation Representatives continue to claim were not evaluated.²² The Order spoke directly to this point, and yet the Aviation Representatives persist with an argument ASRI first raised *over two years ago*. The record is also clear that the FAA initially favored a 500-foot assessment zone, and developed the 250-foot approach and submitted it to the RTCA Technical Operations Committee.²³

Equally groundless are the Aviation Representatives' claims regarding Unmanned Aerial Systems ("UAS"). In addition to repeating arguments that have been before the Commission for years, the Aviation Representatives now suggest that the Order assumed that all UAS operating near Ligado base stations would be "small UAS inspecting and monitoring antenna structures."²⁴ This is flat-out wrong. The Order specifically addressed larger UAS, which it concluded would be expected to respect the same obstacle clearance surfaces identified by the FAA for manned aircraft.²⁵ The Aviation Representatives again ignore the Order's thorough discussion of UAS operations,²⁶ and the Commission need not entertain these meritless—and repetitive—claims.

²⁰ See Letter from Andrew Roy, Aviation Spectrum Resources Inc., and Max Fenkell, Aerospace Industries Association, to Marlene H. Dortch, Secretary, FCC, IB Docket Nos. 12-340 and 11-109 (filed Oct. 9, 2020) ("Aviation Representatives Oct. 9 Letter"); Letter from Andrew Roy, Aviation Spectrum Resources Inc., and Max Fenkell, Aerospace Industries Association, to Marlene H. Dortch, Secretary, FCC, IB Docket Nos. 11-109 and 12-340 (filed Aug. 24, 2020).

²¹ See Ligado Opposition at 16–19.

²² See Order ¶ 72 (recognizing "that the FAA came to [its] conclusions based on the most restrictive scenarios involving helicopter flight near Ligado's base stations");

²³ See DOT ABC Report at VII (describing the FAA's work "in developing [the] assessment zone").

²⁴ See Aviation Representatives Oct. 9 Letter at 3 n.8.

²⁵ See Order at ¶ 72.

²⁶ See *id.* at ¶¶ 72, 88.

At this point, it is clear that these parties would rather commit resources to making repetitive claims than actually contribute to efforts to promote aviation safety or to advance our national progress toward 5G. Tellingly, despite the Order's clear expectation that ASRI work with Ligado on the creation of a base station database,²⁷ ASRI continues to refuse to participate in any way in its construction or maintenance. Ligado stands ready to work with ASRI and other stakeholders should they show any interest in actually providing base station information to the aviation community, but we are prepared to continue without their participation.

* * *

Please direct any questions to the undersigned.

Sincerely,

/s/

Gerard J. Waldron

Hannah Lepow

Counsel to Ligado Networks LLC

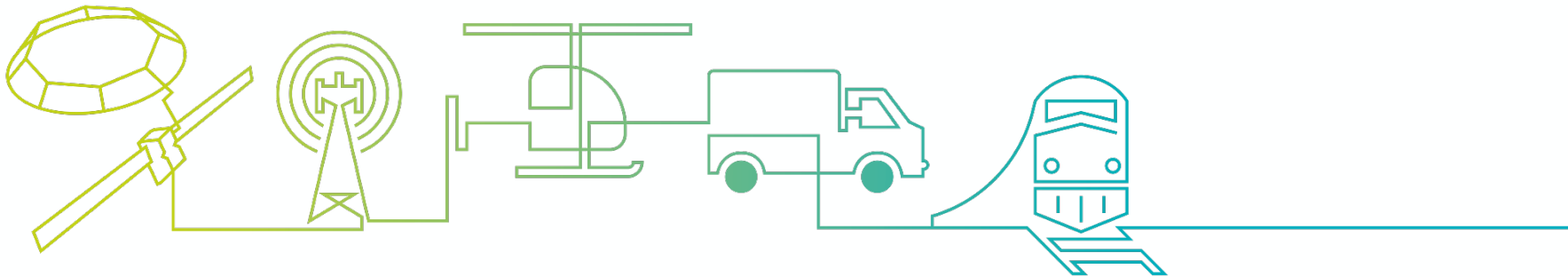
Attachments

cc: Meeting attendees

²⁷ See *id.* at ¶ 95 n.318 (“We expect that ASRI, considering its concerns, expertise, and long-standing engagement in this proceeding, will work in good faith with Ligado [to create the database].”).

Ligado Update

NOVEMBER 2, 2020



6-Month Update

- As demonstrated in the six-month status report recently filed, Ligado has been hard at work on the license conditions set forth in the Order.
 - Implementation of safeguards:
 - Base station database
 - Reporting hotline and notification process for interference complaints
 - “Stop buzzer” capability
 - Coordination with federal agency GPS users
 - Outreach to Iridium
- Significant Progress in 3GPP
- Strong Financial Position

Iridium Relitigates Settled Issues

- Iridium has filed repeatedly on the Ligado Order but those filings just make the same points over and over again.
- These are variations on the same theme:
 - Iridium argues that the Order did not sufficiently address Iridium's technical analysis. As we have documented, the Order carefully addresses Iridium's arguments in some detail. See Order ¶¶ 116-18.
 - Iridium continues to claim that the FCC did not adequately address interference to Iridium's aviation services. But Iridium once again ignores the basic facts in the record as reflected in the Order.
 - In its most recent filing, Iridium claims that the OOB limits adopted in the Order are less protective of Iridium than those extended to other services. But that is demonstrably false since the Order actually gives Iridium *more* protections than other services.

Iridium Has No Operational Issues In-Flight, Taxiing, or During Takeoff/Landing

- Iridium's recent presentation to aviation stakeholders shows that its only operational issues with Ligado occur at the gate:
 - Iridium devices in use in flight above 1000 ft/300 m would not experience aggregate interference due to intentional (i.e., overload) or unintentional (i.e., OOB) emissions.
 - Iridium devices in use during taxi, takeoff, and landing would not experience interference from unintentional emissions.
 - Overload emissions are not an issue between Iridium and Ligado. Iridium bears sole responsibility for its services' management of receiver overload, just like every service provider.
- Ligado again reached out to Iridium to coordinate any gate operational issues, which Ligado first sought to discuss nearly four years ago. We look forward to an honest discussion about the legitimate technical issues.

Progress Made with the Aviation Industry Despite ASRI's Distractions

- Ligado is building a base station database for the aviation community.
 - Ligado has selected TeleWorld Solutions, Inc., a leading networks services and software development provider, to help build and maintain a base station database.
 - Ligado plans to present a mock-up of the database and solicit feedback from aviation stakeholders at a future Airlines Electronic Engineering Committee (AEEC) meeting.
- ASRI criticizes the database, but refuses to participate in any way in its creation. This, despite the Order's clear expectation that it do so. See Order ¶ 95 n.318.
- Instead, ASRI continues to waste resources and time rehashing claims that the Commission has long since considered and rejected.

Questions
